Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period: \_\_\_\_\_

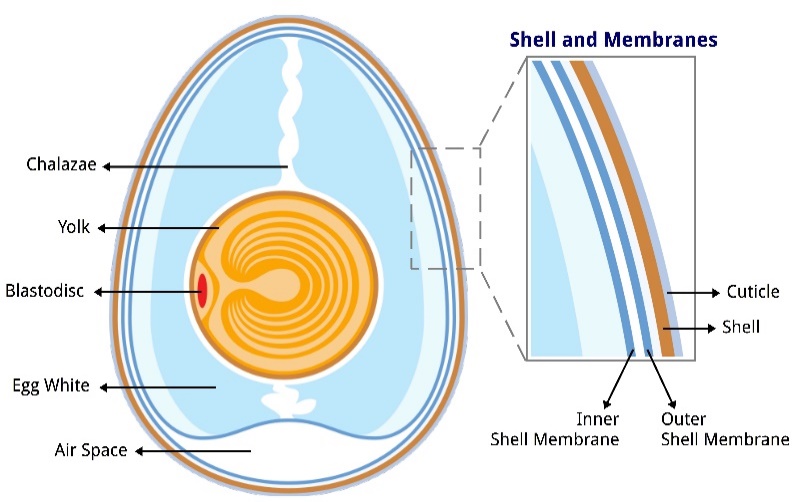
Egg Osmosis Experiment

Question: **What will be the outcome of submerging the egg in the various solutions?**

Background information:

Most cells are tiny – much too small to see without the help of a microscope. In contrast, an unfertilized chicken egg is a giant cell. You will use a chicken egg to investigate movement of water, or osmosis, across the cell membrane that surrounds each cell.

The acetic acid of vinegar dissolves the calcium carbonate of an egg shell. What remains is a large cell surrounded by inner and outer membranes which are selectively permeable.



The blastodisc contains the cell’s nucleus. The yolk, which is rich in lipids, proteins, and carbohydrates is the cytoplasm. The egg white is known as the albumen (from albus, Latin for “white”). It is like a vacuole storing approximately 40 different proteins.

A chicken egg has 88% water in the white and 48% water in the yolk. Overall, a chicken egg is 74% water, which is similar to the ~70% water in typical animal cells.

Hypotheses:

**If a de-shelled chicken egg is placed in** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (type of solution)

**then the egg will** (circle one): *swell / shrink / remain the same size*

**because** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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Materials:

* 2 eggs soaked in vinegar (acetic acid) for at least 24 hours
* 2 plastic cups with blank labels
* Corn syrup
* Salt water
* Vinegar
* Tap water
* Distilled water
* Electronic balance
* String
* Ruler
* Beakers (for measuring

Experimental Plan:

1. What type of solutions will you submerge the egg in?
2. What will you keep constant (the same) between all two experimental groups?
3. Write down the procedure for your experiment. (It has been started for you)
   1. Obtain all necessary materials.
   2. Label each cup with the name of the solution you will be using.
   3. Mass each of the eggs using the digital scales.
   4. Wrap a string around the middle of the cell. Place the string on a ruler to determine the circumference, in cm, of each egg.

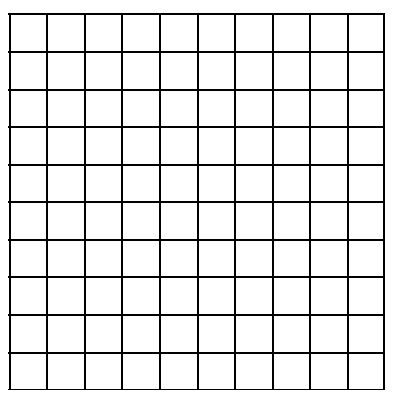
Data:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Egg in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | | Egg in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | |
| Day 1 | Day \_\_\_\_ | % change\* | Day 1 | Day \_\_\_\_\_ | % change\* |
| Mass (g) |  |  |  |  |  |  |
| Circumference (cm) |  |  |  |  |  |  |
| Description of egg |  |  | n/a |  |  | n/a |

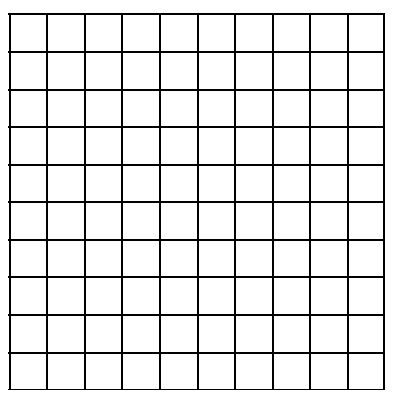
\*% change = (Day 1 measurement – Day \_\_\_ measurement) / Day 1 measurement

Graphs:

Mass (g) of Eggs Before and After Put in Solution



Circumference (cm) of Eggs Before and After Put in Solution



Analysis:

In which solution did the egg gain the most mass? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

In which solution did the egg’s circumference increase the most? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

In which solution did the egg lose the most mass? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

In which solution did the egg’s circumference decrease the most? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Discussion/Conclusion:

1. Describe your results.
2. If an egg changed in mass or circumference what process likely occurred? Explain your answer.
3. If an egg increased in mass or circumference what does that suggest about the water concentration inside vs outside the cell at the beginning of the experiment?
4. If an egg decreased in mass or circumference what does that suggest about the water concentration inside vs outside the cell at the beginning of the experiment?
5. Was your hypothesis supported or not supported by the data? Explain your answer citing data from the lab.
6. Explain, using scientific terminology (ex. osmosis), why you think you got the results you recorded.
7. Describe any possible errors and what could be done to improve them if you did the experiment again.